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## **Composition of the product**

Medical Suction Machine is composed of a suction pump, liquid bottle, main machine, filter, vacuum meter, and switch, etc

## **Technical Parameter**

Suction pump	piston-type pump
Ultimate negative pressure value	<0.06Mpa
Ultimate negative pressure range	0.02Mpa~ Ultimate negative pressure value
Pumping rate	≤ 20L/min
Time adjustment range	The time of operation and stop should be adjusted arbitrarily within 1~ 10min
Power source	~220V 50Hz
Input power	100VA
Noise	≤55dB (A)
Fuse tube	φ5X20/ F2A

## **The scope of products**

The product is used for sputum suctioning, etc. It can not be used for abortion suction.

## **Contraindication**

- Untreated active bleeding
- Abnormal blood coagulation
- Direct exposure of vascular nerve and viscera
- Cancer in the wound

## Attention

- The apparatus should be operated by a medical professional.
- Read the manual carefully before using it. To prevent an explosion this equipment should not be close to combustible and explosive gas.
- Before using, check the function of the equipment, then connect the disposable drainage
- Dressings or disinfectant flexible catheter and abdominal cavity pipet.
- Power it on the pointer on the vacuum gauge will rapidly rise to the ultimate negative pressure value Loosen the suction inlet, and the pointer will back to under 0.01MPa.
- Connect the disposable drainage dressings or suction catheter. The negative pressure value should be under 0.04Mpa which shows that the equipment is in gear.
- Plug up the suction inlet, power it on, and adjust the regulating valve. The reading on the vacuum gauge should be within 0 .02Mpa ~ ultimate negative pressure value. In clinical utilization, use a Negative pressure regulating valve to control the negative pressure value.
- If the filter is full of foam or dust, the color of the filter membrane will be changed from light to dark and it will also reduce the suction. When the negative pressure value is over 0.04Mpa, the air filter should be changed.
- Disposable suction tubes and silicon tubes at a length of over 2 meters are recommended to support the use of suction.
- The service of the suction is about 2500~3000 hours.
- When the water level of a liquid accumulator is over 1200ml, the overflow protector will start.

## Installation and Instruction

### Tube connection

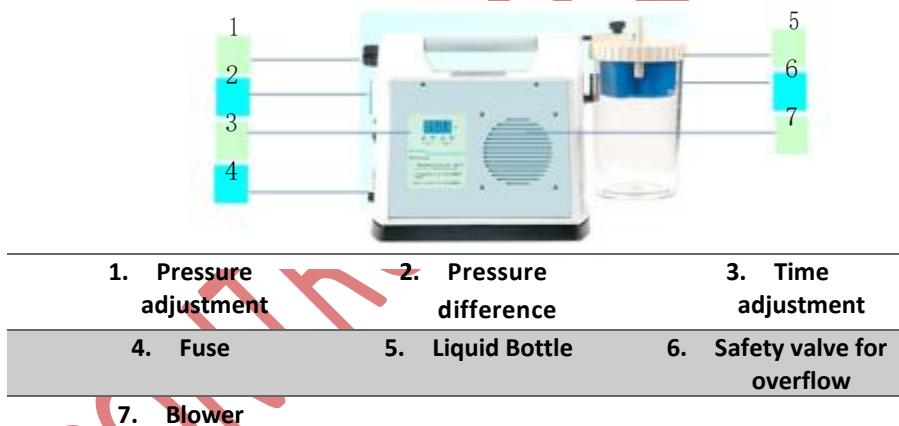


Medical suction apparatus

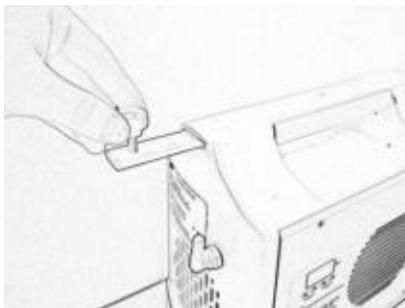
Suction tube

Dressing with PVA texture

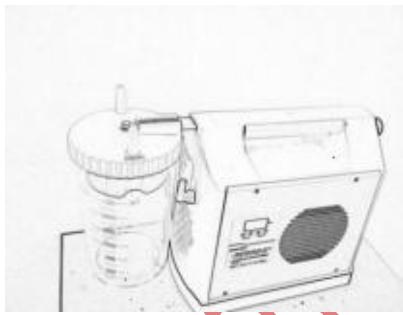
### Panel instruction



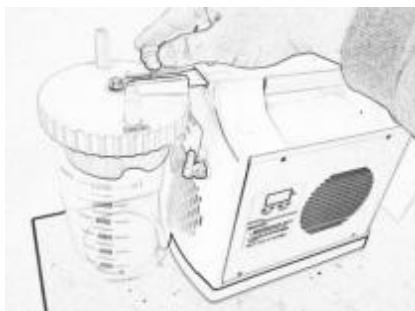
## Tube connection



unscrew the nut



put the liquid bottle into fix plate



screw the nut, fix the liquid bottle



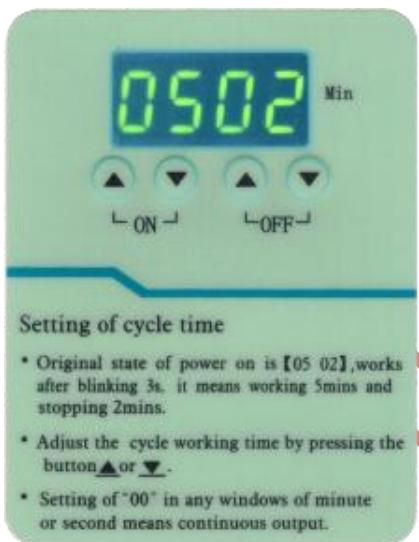
connect the connector of a bottle (TO  
UNIT) and suction port with filter  
tube



Insert the suction tube to  
patient connector of the liquid bottle

## Clarification about installation and function text

1. Overhead contact power connection: The power connection must be properly grounded. Attention: The disconnecting device of the product is a power plug, and the power socket must be grounded.
2. Power it on. The indicator light is lit which shows the machine is prepared to run.
3. Setting the time. (See the picture)



- When the power is on, the default time setting is 05 02, the time unit is a minute.
- 05 02 shows the duty-cycle operation of the equipment: working time (ON) is 5 minutes, and the hault time (OFF) is 2 minutes.
- When you press it means going up, when you press it means going down (The changing range is 1 minute). When you need adjustment, you can directly adjust by pressing these 2 buttons, and the number will be flashing and be automatically confirmed within 2 minutes.
- Countdown of the working time. For example, when it shows 05, it would show 04 after working for 1 minutes.

- Either the working time or halt time is set at 00 (Both working time and halt time are set at 00, it would show “P”), the equipment will run output continuously with the cycle operation failed.

### **Examination of the tubing**

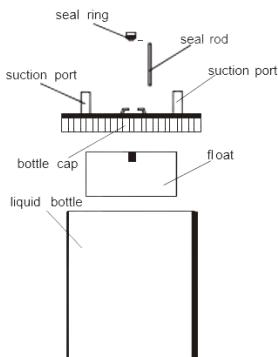
- When the suction is functioning, screw tightly the negative pressure valve in clockwise direction, block off the gas source port with finger or rubber dropper. Or you can also fold and pinch the soft catheter.
- The pointer of the vacuum pressure gage will be up to ultimate negative pressure value. Loosen the suction port, the pointer will be down to under 0.02 Mpa.

### **Adjustment of the negative pressure**

Power it on and it is functioning properly. Block off the suction port and adjust the negative pressure valve, the pointer on the vacuum gauge should be within 0.02Mpa ~ ultimate negative pressure.

Attention the negative pressure goes up when rotating the regulating valve in the clockwise direction.

## Inspection and examination of the overflow protection device (see picture)



- Open the bottle cap, clean the valve subassembly, inspect ball cock device, and the valve disc should be connected properly with the float without fault such as deformation and tear. The float should be moved flexibly without blocking.
- Connecting the valve subassembly and put it on the water, making the float exposed to the water surface vertically, and then move down the bottle cap. The float should be floated on the shelf to make the valve plate block off the gas port.
- Connecting the liquid bottle properly, connecting the soft tube with the suction inlet and screw the regulating valve, then operate the suction.
- Put the soft tube into a scuttlebutt, or simulate the condition under normal use, sucking the liquid into a liquid bottle which is equipped with overflow device. When the level of liquid goes up, the float will rise until the valve port shut down and the suction stop automatically. The ultimate level of the the liquid will change with different methods of suction.
- Unscrew the regulating valve and shut down the switch of the equipment.
- Open the bottle cap and empty the liquid bottle. When the cap is screwed tightly again, the float should be in the

bottom of the float shelf and the valve port should be open.

When the situations mentioned above are true, it shows the smooth function of the overflow device.

- ❖ When the valve of overflow device stop shutting down, there might be two causes if the level of liquid keeps going up:
  1. It might be caused by the remained negative pressure
  2. The valve port has not be shut down completely. The first situation, when the soft catheter is out of the liquid and then stretch in the liquid again, the liquid level stop going up, The Second situation is that the level of the liquid keeps going up. It requires careful observation. When the liquid is going to spill, the soft catheter should be lifted from the liquid, and shut down the suction apparatus to find out the reason of valve malfunction.
- ❖ After the float valve shuts down, the suction stops. However, owing to the negative pressure of the tube, the float might still be sucked on the valve port. If this situation occurs, the regulating valve should be loosened or the suction should be stopped. Do not drag the float to avoid the rubber valve being away from the float.
- ❖ Only after shutting down the apparatus and then discharge the negative pressure can the bottle cork be open.
- ❖ It is forbidden to use the suction apparatus without overflow device and catheter.

### **Machine halt**

After installation and debugging, the switch on the suction apparatus should be shut down and then the power plug should be pulled.

### **Operating instruction (Operated by medical professionals)**

- Before using the apparatus, check the suction apparatus according to the installation and debugging procedure. After making sure the good performance of the apparatus, connecting the disinfectant sucking soft catheter and abdominal cavity pipet. Then the apparatus can be used.

Pay attention to the pressure status of pressure gauge and make sure that the pressure can not exceed the approved pressure.

- During using, the negative pressure can be adjusted to the required value. Notice the level of the liquid in the bottle. When the liquid level goes up to marker capacity, the operation about sputum suction should be stopped and the bottle should be emptied and cleaned up before reusing it. Otherwise the float will rise until the valve shut down and the suction will be forced to stop. If there active pressure during suction, the operation should be stopped immediately.

Attention the use of the suction apparatus should be operated in strict accordance with the program operation under the guidance of the professional medical personnel.

## Maintenance

### Replacing the filter

If the air filter is full of foam and dust, the color of the filter membrane will changed from light to deep and the suction will be less and even disappear. And in addition the negative pressure value on the vacuum gauge will grow up continuously to over 0.04MPa. If these situations above happen, the filter should be replaced in time.

- During using, shutting down of the overflow device and blocking up of the pipe maycause a decrease of suction and rise of negative pressure value. See the trouble elimination and troubleshooting.
- The air filter should be changed frequently

### Replacement of fuse tube

The fuse tube was in the case board. When the fuse tube need to be replaced, firstly the power should be off, and then the cover of the fuse tube should be unscrewed.

## The method and frequency of maintenance

- Before stopping the machine, it's suggested to put some clean water into suction tube in order to clean the pipe walls.
- After stopping the machine, users should empty the liquid bottle, clear up the dirt on the bottle and cork with soft brush or rag, and then wash the equipment with clean water, including overflow device and all kinds of tubes. If necessary, unscrew the overflow device and take apart the components and remove the guide tube to thoroughly clean the equipment.
- When the equipment is not in use, it should be kept dry and clean. It is suggested to operate the machine every half year.
- When the machine runs again, the overflow device, catheter and other tubes must be connected properly according to the tube connection.
- The position of the three pins on the guide tube is non- uniform, it should be ensured that the pipe orifice point towards the bottle inside.

Taking apart the liquid bottle:



1. unscrew the liquid bottle



2. take off the bottle



3. empty the bottle, and screw the bottle again

## Disinfection method

The used sputum suction tube should be cleaned with saline. If the sputum tube is not expedite, it should be replaced. Disposable sputum tube is suggested. The surface of the equipment should be wiped with moist rag after disinfectant soaking.

## **Disposal and abandonment**

For the disposable suction tube, filter and dressing they should be disposed and abandoned properly as medical waste.

## **Troubleshooting**

Trouble	Reason	Method	Comment
1. negative pressure value < ultimate negative pressure value	1. Air leakage on the bottle neck 2. Air leakage and loose of regulating valve 3. Air leakage on the tube connecting	1. Screw the bottle cap 2. Screw the regulating valve 3. Check the tube connection	1. There is dirt on the bottleneck 2. Replace the suction tube when there is a break
2. negative pressure value $\geq$ 0.04Mpa, but the suction decrease or disappear	1. Overflow device shut down 2. Pipe blocking 3. Blocking of safety device	1. Unscrew the regulating valve, release the negative pressure and screw it again 2. Unchoke or replace the soft catheter or suction tube	1. Empty the collection 2. Contact the manufacturer
3. Power on but the equipment doesn't operate	1. Socket is loose 2. Fuse tube melts	1. Check or replace the socket 2. Replace the fuse tube	1. Replace the fuse tube
4. The fuse tube melts.	1. Overloading 2. Break down of internal wiring	1. Repair line	1. Repaired by professional people

## **Method of storage and transportation**

During transportation the equipment should be stored in ventilated place at -40°C~55°C, preventing rain and sun and avoiding jolt.

## **Explanation of the graph, symbol and abbreviation**

Symbol	Explanation	Symbol	Explanation
~	~ alternating current power supply. 220V,50Hz		Attention
I	I type equipment		Protective grounded
	B type equipment		The symbol of power on and off

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# MEDICAL SUCTION MACHINE

## MSM-01

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Manual Book